

REMARKS

Information Disclosure Statement

An IDS is being submitted concurrently with this Amendment. The IDS includes a copy of JP 6-6252194, which was not provided with the IDS dated March 10, 2004. The IDS also cites the parent application. In addition, the "Cross Reference To Related Applications" has been amended to include a patent number for the parent application.

Rejections Under 35 USC §102 and 35 USC §103

Claims 37-44 have been rejected under 35 USC §102(b) as being anticipated by Moden (US Patent No. 6,310,390).

Claims 45-63 have been rejected under 35 USC §103(a) as being unpatentable over Moden (US Patent No. 6,310,390) in view of Corisis (US Publication 2002/0027280).

The rejections under 35 USC §102 and 35 USC §103 are traversed for the reasons to follow.

Summary of the Invention

Claims 37-63 are directed to a method for fabricating a semiconductor component 10 (Figure 2E). The method is illustrated in Figures 2A-2E and 3A-3D.

As shown in Figure 2A, the method includes the steps of "providing" a leadframe 12. The leadframe 12 includes leadfingers 28 (Figure 3A) having interconnect bonding sites 32 (Figure 3A) for wire interconnects 16 (Figure 2C), and terminal bonding sites 30 (Figure 3A) for terminal contacts 18 (Figure 2E). In addition, the terminal bonding sites 30 (Figure 3A) can be arranged in an area array such as a grid array, edge array or peripheral array. The interconnect bonding sites 32 are referred to as "first bonding sites", and the terminal bonding sites 30 are referred to as "second bonding sites" in claim 37. The leadframe 12 also includes bus bars 34 (Figure 3A) which

electrically connect selected leadfingers 28 (Figure 3A) to one another.

As shown in Figure 2B, the method also includes the step of "attaching" semiconductor dice 22 to the leadframe 12. During the "attaching" step, and as shown in Figure 3A, the dice 22 at least partially covers the bus bars 34.

As shown in Figure 2C, the method also includes the step of "bonding" wire interconnects 16 to the dice 22, and to the interconnect bonding sites 32. During the "bonding" step, the locations of the dice 22 (Figure 1F) on the bus bars 34 (Figure 1F) prevents shorting between bus bars 34 and the wire interconnects 16.

As shown in Figure 2D, the method also includes the step of "forming" an encapsulant 20 on the dice 22 and the wire interconnects 16.

As shown in Figure 2E, the method also includes the steps of "forming" terminal contacts 18 on the terminal bonding sites 30, and then singulating the components 10 from the leadframe 12.

Argument

The independent claims have been amended to emphasize features of the method, which are not disclosed or suggested by the prior art. In particular, the present method provides a leadframe that includes leadfingers having a die mounting site, terminal bonding sites in an area array, and interconnect bonding sites. In addition, the leadfingers include bus bars connecting selected leadfingers, and selected terminal bonding sites. Further, during a bonding step of the method the bus bars are protected by the die, such that shorting between the bus bars and the interconnects is prevented.

In regard to these features, please note Figure 1E of the present application in which the bus bars 34 connect selected terminal bonding sites 30 on the leadfingers 28. As also shown in Figure 1E, the die 14 attaches to the

leadfingers 28, and substantially covers the bus bars 34. As shown in Figure 2C, during the bonding step, this arrangement prevents the bus bars 34 from touching and shorting to the interconnects 16.

Moden was cited as teaching a fabrication method in which a leadframe includes both terminal bonding sites in an area array and interconnect bonding sites. However, in Moden there are no bus bars in the area array connecting selected terminal bonding sites. Further, there is no suggestion of "attaching" and "bonding" steps adapted to eliminate shorting between bus bars and interconnects.

Corisis et al. was cited as teaching a leadframe 12 having bus bars (leads 42, 44-Figure 3). However, as shown in Figure 3 of Corisis et al., the die 14 is attached to the leadframe 12, such that the bus bars (leads 42, 44-Figure 3) can short to the interconnects (wire bonds 22). In particular, the wire bonds 22 only need to shift or sag by a small amount to touch and short to the bus bars (lead 42, 44). In the present method, during the bonding step, the bus bars are protected from shorting to the interconnects by the die.

Further, if Moden and Corisis were to be combined, the bus bars would be located outside of the area array, and outside of the die, such that shorting to the bus bars could occur. In the present component, the bus bars 34 are in the area array, and the die 14 (Figure 1C) at least partially covers the bus bars 34 (Figure 1E), which prevents shorting to the interconnects 16.

Another distinguishing feature of the present component is that the leadfingers 28 (Figure 3A) include tip portions, and terminal bonding sites 30 (Figure 3A), that are configured to provide a die mounting site 42 (Figure 3A). In this regard, note Figure 1E of the present application in which the die 14 is supported by the tip portions of the leadfingers 28, and by the terminal bonding sites 30. In Figure 3 of Moden, the ball bonding pads 28

are relatively far apart, such that a polymer tape 36 (Figure 1C) is required to support the die 12. In Corisis et al., the die 14 is supported by a tape 16 (Figure 2-paragraph 20), or by a paddle 40 (Figure 3-paragraph 24).

Each independent claim has been amended to emphasize the above noted features of the claimed method. Amended independent 37 recites the step of "providing a leadframe comprising a plurality of leadfingers having first bonding sites on a first side and second bonding sites on a second side, and a bus bar connecting at least some of the second bonding sites".

Claim 37 also recites the step of "attaching a semiconductor die to the first side at least partially covering the bus bar". Antecedent basis for this recitation is contained on page 10, lines 11-15 of the specification. Claim 37 also recites the step of "bonding a plurality of interconnects to the die and to the first bonding sites with the die preventing the interconnects from shorting to the bus bar". Antecedent basis for this recitation is contained on page 14, lines 26-35 of the specification.

Amended independent claims 40, 45, 51 and 57 each include "providing", "attaching" and "bonding" steps, as stated above for claim 37.

Amended independent claims 40 and 51 also state that the bus bar is "in the area array", which is shown in Figure 3A. With the bus bar in the area array, shorting to the interconnects on the opposing side of the leadframe is prevented.

Amended independent claim 45 also states that the leadframe is provided with "a die mounting site formed by the leadfingers and the terminal bonding sites". Antecedent basis for this recitation is contained on page 12, lines 27-32 of the specification. Similarly, amended independent claim 57 states that the leadfingers include "a die mounting site on the first side". As argued above, the

combination of Moden and Corisis et al. does not disclose this die mounting arrangement on a leadframe having both terminal contact bonding sites and interconnect bonding sites.

In view of the above noted recitations the amended claims "taken as a whole" are submitted to be novel and unobvious over the art.

Conclusion

In view of the amendments and arguments, favorable consideration and allowance of claims 37-63 is respectfully requested. Should any issues arise that will advance this case to allowance, the Examiner is asked to contact the undersigned by telephone.

DATED this 16th day of September, 2005.

Respectfully submitted:



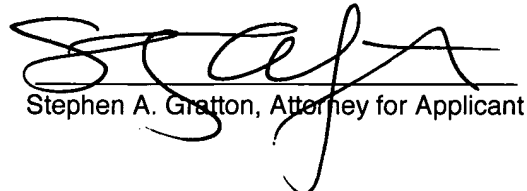
STEPHEN A. GRATTON
Registration No. 28,418
Attorney for Applicant

2764 S. Braun Way
Lakewood, CO 80228
Telephone: (303) 989-6353
FAX (303) 989-6538

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September 16, 2005
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Stephen A. Gratton, Attorney for Applicant